4. GENERAL PROTECTION/COLLECTION STRATEGIES

4.1. Chapter Overview

This chapter details the specific response strategies and resources to protect as outlined by the participants of the GRP workshop for the Willapa Bay area. It describes the strategies determined for each area and the prioritization of those strategies. Note that GRPs only address protection of sensitive **public** resources. It is the responsibility of private resource owners and/or potentially liable parties to address protection of private resources (such as commercial marinas, private water intakes, and non-release aquaculture facilities).

Maps & Matrices

The maps in this chapter provide information on the specific location of booming strategies. They are designed to help the responder visualize response strategies. Details of each booming strategy are listed in corresponding matrix tables. Each matrix indicates the exact location, intent and implementation of the strategy indicated on the map. The "Status" column describes whether the strategy has been visited or tested in the field, and the date of the visit/test. Most strategies include a number for the corresponding shoreline photo, which is available on the Washington Department of Ecology's internet site at http://www.ecy.wa.gov/apps/shorephotos/.

Major Protection Techniques

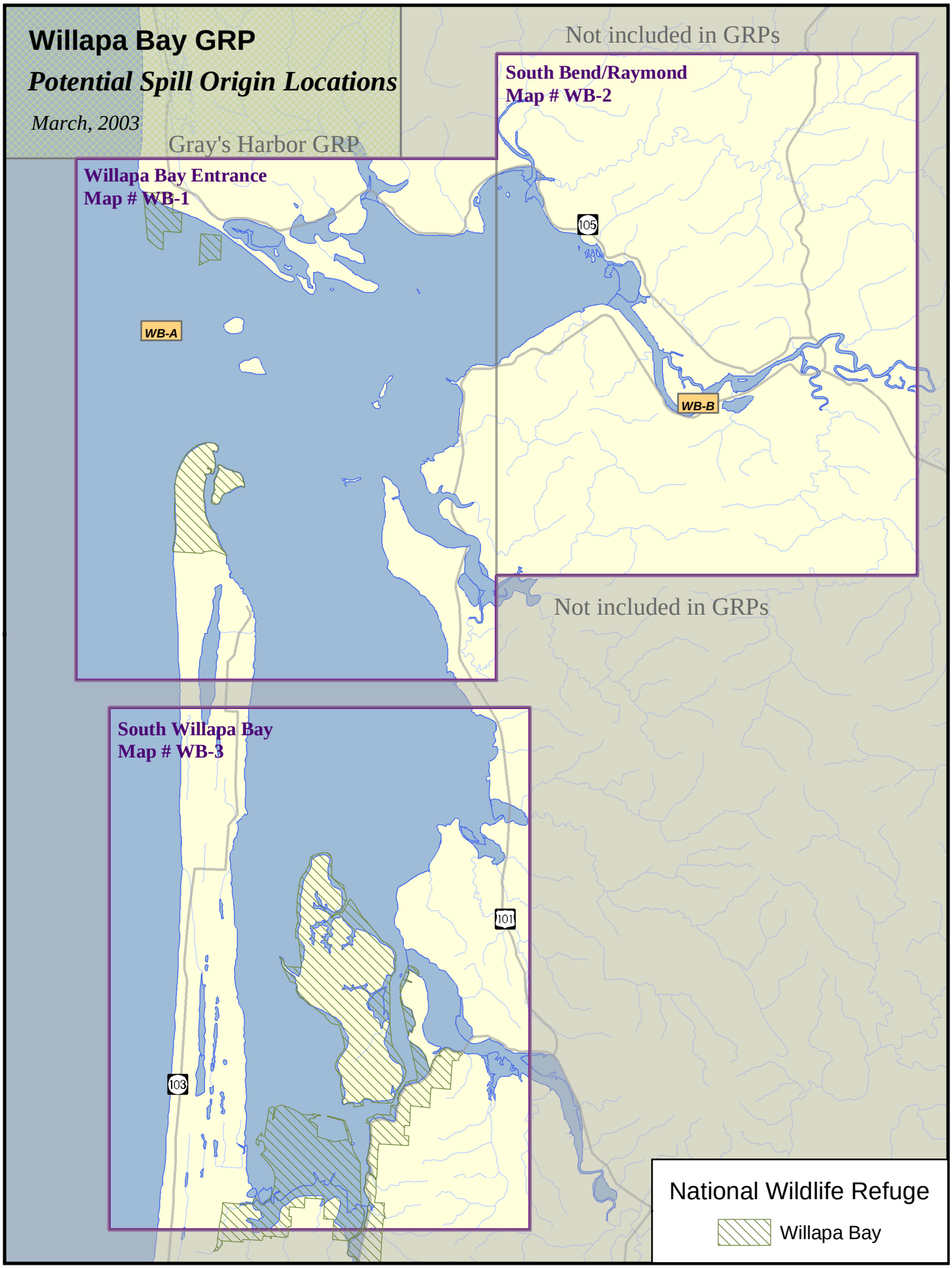
All response strategies fall into one of three major techniques that may be utilized either individually or in combination. The strategies listed in Section 4.2 are based on the following techniques, and are explained in detail in Section 4.3:

Dispersants: Washington State Policy currently does not allow use of dispersants in this area. Certain chemicals break up slicks on the water. Dispersants can decrease the severity of a spill by speeding the dissipation of certain oil types. Their use will require approval of the Unified Command. Dispersants will only be used in offshore situations under certain conditions, until further determinations are made by the Area Committee and published in the Area Contingency Plan.

In Situ Burning: Approval to burn in this area is unlikely due to the proximity of population to a potential burn site. Burning requires the authorization of the Unified Command, who determine conformance of a request to burn with the guidelines set forth in the Area Plan. This option is preferable to allowing a slick to reach the shore provided that population areas are not exposed to excessive smoke. Under the right atmospheric conditions, a burn can be safely conducted in relative close proximity to human population. This method works on many types of oil, and requires special equipment including a fire boom and igniters.

Mechanical Recovery and Protection Strategies: If a spill is too close to shore to use In Situ burning or dispersants, the key strategies are skimming and use of collection, diversion, or exclusion booming to contain and recover the oil, and prevent it from entering areas with sensitive wildlife and fisheries resources. These options are described in detail in Appendix A. Specific skimming strategies are not listed in the maps and matrices, but skimming should be used whenever possible and is often the primary means of recovering oil and protecting resources, especially when booming is not possible or feasible.

Priorities: The strategy priority tables (Section 4.2.) were developed using specific locations where spills are likely to occur. Trajectory modeling was used for each of these "Potential Spill Origins" to identify sensitive resources that would likely be impacted within the initial hours of the spill. A booming strategy priority table was developed for each of the "Potential Spill Origins" based on the sensitivity of resources, feasibility, etc. **Booming strategies should be deployed following the priority table for the "Potential Spill Origin" closest to the actual spill origin.** The map on page 4-2 shows the locations of all Potential Spill Origins for the Willapa Bay GRP. The booming strategies indicated in the priority tables are explained in detail in the Maps & Matrices section (Section 4.3.). It is implied that control and containment at the source is the number one priority of any response. If in the responder's best judgment this is not feasible, then the priorities laid out in the priority tables take precedence over containment and control.


Willapa Bay GRP
Potential Spill Origin Locations
March, 2003
Gray's Harbor GRP
Not included in GRPs
South Bend/Raymond
Map # WB-2
Willapa Bay Entrance
Map # WB-1
105
WB-A
WB-B
Not included in GRPs
South Willapa Bay
Map # WB-3
101
103
National Wildlife Refuge
Willapa Bay

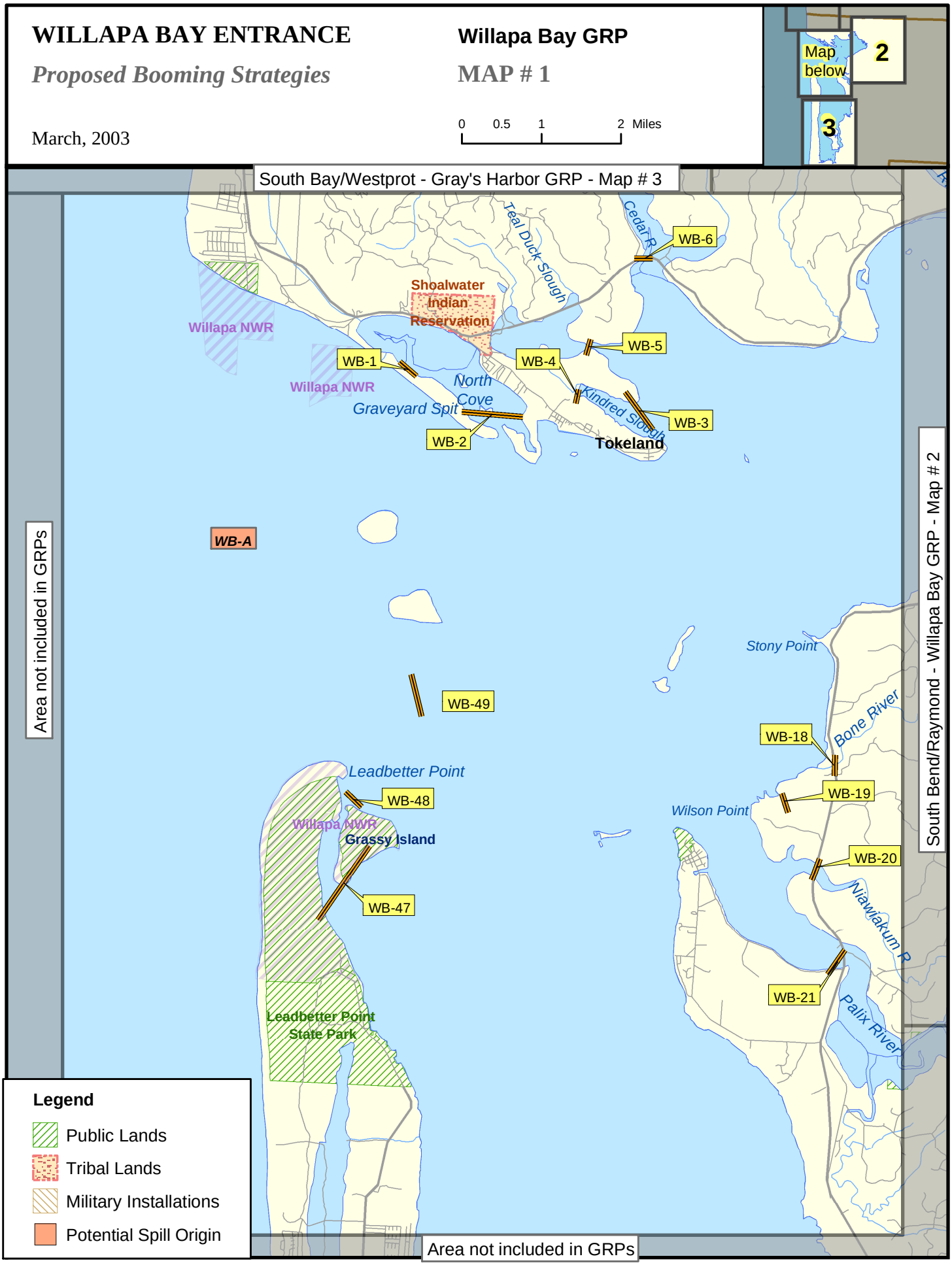
4.2.2 Booming Strategy Priority Tables

Table 4-1

Potential Spill Origin: WB-A - Oil entering Willapa Bay on a flood tide from a source outside of the bay			
BOOMING PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
1	WB-1	4-5	
2	WB-2	4-5	
3	WB-47	4-5	
4	WB-48	4-5	
5	WB-3	4-5	
6	WB-4	4-5	Tide Gate
7	WB-5	4-5	Tide Gate
8	WB-6	4-5	
9	WB-7	4-6	
10	WB-8	4-6	
11	WB-18	4-5	
12	WB-19	4-5	
13	WB-20	4-5	
14	WB-21	4-5	
15	WB-12	4-6	
16	WB-15	4-6	
17	WB-9	4-6	
18	WB-10	4-6	Tide Gate
19	WB-16	4-6	
20	WB-17	4-6	

Table 4-4

Potential Spill Origin: WB-B - Oil entering Willapa Bay on an ebb tide from a source in the Willapa River			
BOOMING PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
1	WB-15	4-6	
2	WB-14	4-6	
3	WB-12	4-6	
4	WB-16	4-6	
5	WB-17	4-6	
6	WB-3	4-5	
7	WB-5	4-5	
8	WB-2	4-5	
9	WB-1	4-5	
10	WB-48	4-5	


WILLAPA BAY ENTRANCE
Proposed Booming Strategies
March, 2003
Willapa Bay GRP
MAP # 1
0 0.5 1 2 Miles
Map below
2
3
South Bay/Westprot - Gray's Harbor GRP - Map # 3
Area not included in GRPs
South Bend/Raymond - Willapa Bay GRP - Map # 2
Area not included in GRPs
Teal Duck Slough
Cedar R
WB-6
Shoalwater Indian Reservation
Willapa NWR
WB-1
WB-4
WB-5
North Cove
Graveyard Spit
Kindred Slough
WB-3
WB-2
Tokeland
WB-A
Stony Point
WB-49
Bone River
WB-18
WB-19
Leadbetter Point
WB-48
Willapa NWR
Grassy Island
Wilson Point
WB-20
WB-47
Niawiakum R
WB-21
Palix River
Leadbetter Point State Park
Legend
Public Lands
Tribal Lands
Military Installations
Potential Spill Origin

SOUTH BEND/RAYMOND

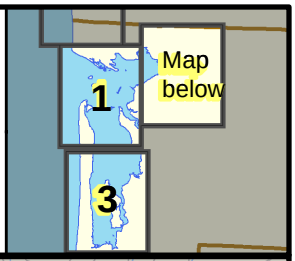
Proposed Booming Strategies

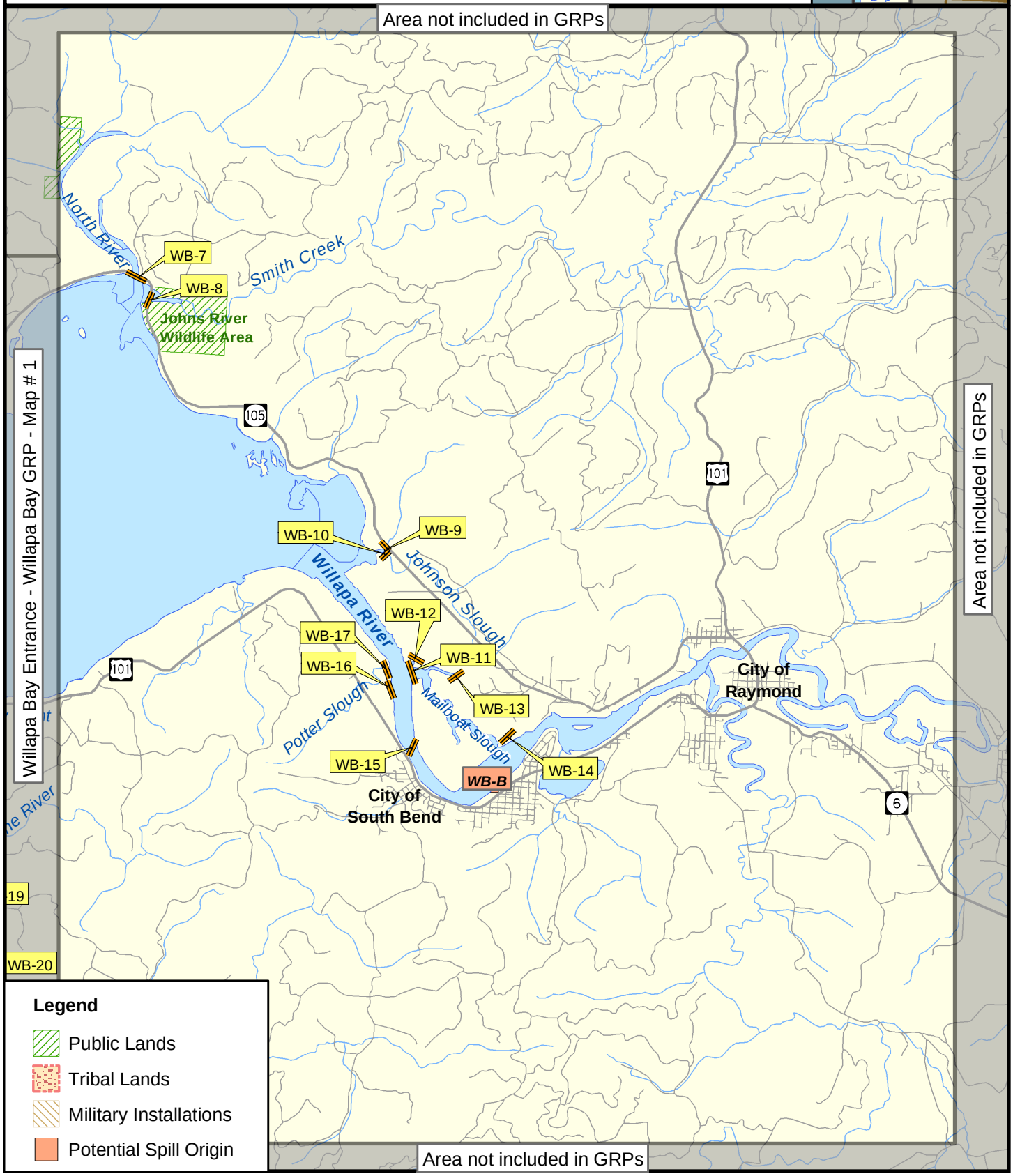
March, 2003

Willapa Bay GRP

MAP # 2

0 0.5 1 2 Miles





SOUTH WILLAPA BAY

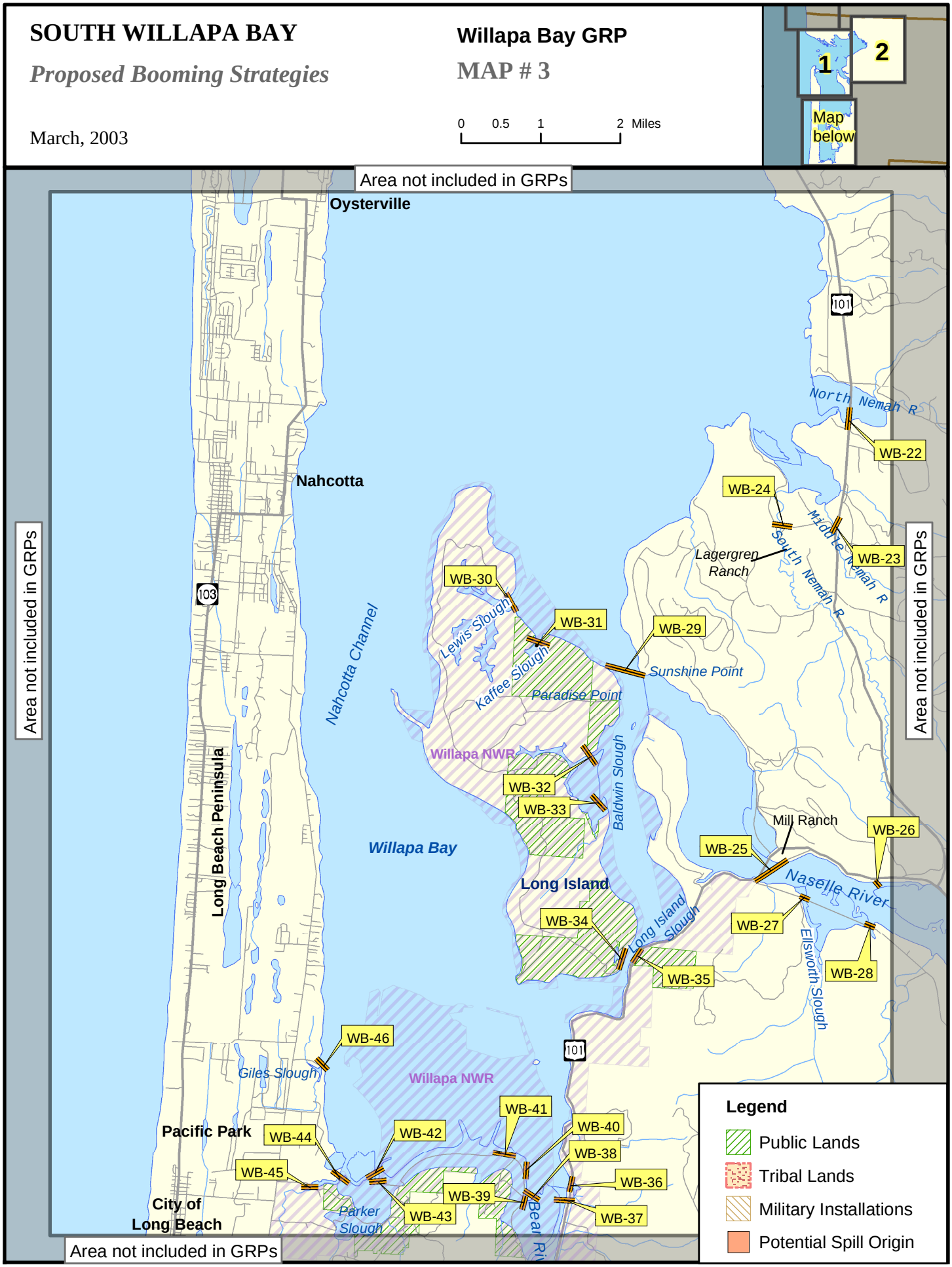
Proposed Booming Strategies

March, 2003

Willapa Bay GRP

MAP # 3

0 0.5 1 2 Miles



4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-1		North Cove PAC0023 46º-43.153'N 124º-02.392'W	Exclusion - Prevent oil from moving into marsh.	900'	Deploy boom across the west opening to marsh. Area nearly dry at low tide.	Tokeland Marina (PAC0042).	By boat only from Tokeland Marina.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-2		North Cove 46º-42.456'N 124º-00.738'W	Exclusion - Prevent oil from moving into marsh.	1500'	Deploy boom at angle to close off east entrance to marsh. Place boom during flood tide or will need ATV's or helicopter. Area nearly dry at low tide.	Tokeland Marina (PAC0042).	By boat only from Tokeland Marina.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-3		Kindred Slough PAC0048 46º-42.562'N 123º-58.268'W	Exclusion - Prevent oil from moving into slough.	2400'	Install boom at an angle across slough entrance. Site can only be boomed at high tide.	Tokeland Marina (PAC0042).	By boat only from Tokeland Marina.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-4		Kindred Slough Tide Gate PAC0047 46º-42.917'N 123º-59.482'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Tokeland Marina (PAC0042).	Must cross private farm land to get to tide gate, access from Highway 105 at north end of levee road. Permission is required or use helicopter.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-5		Teal Duck Slough Tide Gate PAC0053 46º-42.398'N 123º-59.326'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Tokeland Marina (PAC0042).	Must cross private farm land to get to tide gate, access from Highway 105 at north end of levee road. Permission is required or use helicopter.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-6		Cedar River PAC0060 46º-44.398'N 123º-58.570'W	Exclusion - Prevent oil from moving up river.	300'	Install boom at an angle across river mouth downstream of bridge at Highway 105. River may have tide gate (need to verify).	Stage on Hwy 105 at site.	Take Hwy 105 from Raymond toward Tokeland.	Salmon, waterfowl concentrations.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-7		North River PAC0083 46º-45.040'N 123º-53.187'W	Exclusion - Prevent oil from moving up river.	600'	Install boom at an angle across river at bridge on Highway 105.	North River Resort or Smith Creek. Both sites have launch ramps.	Take Hwy 105 west from Raymond to North River Bridge, 10.5 miles.	Salmon, waterfowl concentrations.
WB-8		Smith Creek PAC0083 46º-44.815'N 123º-53.085'W	Exclusion - Prevent oil from moving up creek.	400'	Install boom at an angle across creek at bridge on Highway 105.	Smith Creek boat launch.	Take Hwy 105 west from Raymond to Smith Creek Bridge, 10 miles.	Salmon, waterfowl concentrations.
WB-9		Fleiss Creek PAC0098 46º-42.387'N 123º-49.389'W	Exclusion - Prevent oil from moving into slough/ creek mouth.	200'	Install boom at an angle across slough/ creek at bridge on Highway 105.	Stage along Hwy 105.	Take Hwy 105 from Raymond toward Tokeland. Go 5.4 miles from turnoff of Hwy 101 onto Hwy 105.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-10		Johnson Slough Tide Gate PAC0098 46º-42.337'N 123º-49.345'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Stage along Hwy 105.	Take road from Highway 105 to Willapa Bay Airport, dike access road is off airport road.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-11		Mailboat Slough (west entrance) PAC0103 46º-41.150'N 123º-48.935'W	Exclusion - Keep oil out of slough.	1300'	Deploy boom across slough entrance. Must install during high tide.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-12		Mailboat Slough (middle channel) PAC0103 46º-41.115'N 123º-48.250'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-13		Mailboat Slough (north channel) PAC0103 46º-41.285'N 123º-48.885'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-14		Mailboat Slough (east entrance) PAC0112 46º-40.422'N 123º-47.589'W	Exclusion - Prevent oil from moving into slough.	200'	Deploy boom at an angle across slough entrance.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-15		Willapa River PAC0144 46º-40.283'N 123º-48.908'W	Exclusion/ Collection - Prevent oil from moving up or down river.	1000'	Deploy boom at an 45-60 deg. angle across river. Use boat launch for collection. This strategy can also be used for spills upstream to keep oil out of the bay.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-16		Potter Slough (south entrance) PAC0147 46º-40.955'N 123º-49.269'W	Exclusion - Prevent oil from moving into slough.	250'	Deploy boom across slough entrance. Must install at high tide.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-17		Potter Slough (north entrance) PAC0148 46º-41.138'N 123º-49.269'W	Exclusion - Prevent oil from moving into slough.	250'	Deploy boom across slough entrance. Must install at high tide.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-18		Bone River PAC0174 46º-38.936'N 123º-55.169'W	Exclusion - Prevent oil from moving up river.	300'	Deploy boom at an angle across river on west side of bridge on Highway 101.	Stage at north end of Bone River Bridge just off Hwy 101.	Take Hwy 101 south from Raymond to Bone River.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-19		Wilson Point Marsh PAC0177 46º-38.536'N 123º-55.892'W	Exclusion - Prevent oil from moving into marsh.	100'	Deploy boom at an angle across marsh entrance near old BLM road.	Stage near site where BLM logging road crosses marsh.	Take Hwy 101 13.5 miles south from Raymond. Turn west onto BLM logging road and follow to marsh.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-20		Niawiakum River PAC0185 46º-37.821'N 123º-55.475'W	Exclusion - Prevent oil from moving up river.	800'	Deploy boom at an angle across river west of bridge on Highway 101.	Stage just off Hwy 101 at small oyster company on west side of Hwy, north side of river.	Take Hwy 101 14.5 miles south from Raymond to Niawiakum River.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-21		Palix River PAC0191 46º-36.752'N 123º-55.059'W	Exclusion - Prevent oil from moving up river.	1200'	Deploy boom at an angle across river west of bridge on Highway 101.	Stage at boat launch just south of Palix River bridge.	Take Hwy 101 15.8 miles south from Raymond to Palix River. Site is on north side of river.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-22		North Nemah River PAC0239 46º-30.753'N 123º-53.581'W	Exclusion - Prevent oil from moving up river.	750'	Deploy boom at an angle across river mouth west of bridge on Highway 101. Difficult to boom at low water.	Stage near Hwy 101 at N. Nemah River.	Take Hwy 101 south from Raymond to N. Nemah River bridge.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-23		Middle Nemah River PAC0242 46º-29.628'N 123º-54.096'W	Exclusion - Prevent oil from moving up river.	200'	Deploy boom at an angle across river west of bridge on Highway 101.	Stage off Hwy 101 on dirt road (Lagergren Ranch).	Take Hwy 101 south from Raymond to Nemah River area.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-24		South Nemah River PAC0242 46º-29.627'N 123º-54.106'W	Exclusion - Prevent oil from moving up river.	200'	Deploy boom at an angle across river at bridge for Lagergren Ranch.	Stage off Hwy 101 on dirt road (Lagergren Ranch).	Take Hwy 101 south from Raymond to Nemah River area.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-25		Naselle River PAC0272 46º-25.952'N 123º-53.945'W	Exclusion/ Collection - Prevent oil from moving up river.	2000'	Deploy boom at an angle across river on east side of bridge at Highway 101 to collection site on north shore at old Mill Ranch.	Stage at old Mill Ranch site (north side of Naselle Bridge).	By boat only from the Willapa NWR ramp near the south end of Long Island.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-26		Roaring Creek Slough 46º-25.709'N 123º-52.457'W|	Exclusion - Prevent oil from moving into slough.	600'	Deploy boom at an angle across slough entrance.	Stage at old Mill Ranch site (north side of Naselle Bridge).	By boat only from the Willapa NWR ramp near the south end of Long Island.	Shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-27		Ellsworth Slough 46º-25.590'N 123º-53.599'W	Exclusion - Prevent oil from moving into slough.	600'	Deploy boom across slough entrance north of bridge at Parpala Road.	Stage at Ellsworth Slough just off of Parpala Road.	Take Hwy 101 south from Raymond to Naselle River Bridge. Cross bridge and take first left (Parpala Road).	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-28		Smith Creek 46º-25.310'N 123º-52.472'W	Exclusion - Prevent oil from moving up creek.	400'	Deploy boom across creek mouth north of bridge at Parpala Road.	Stage along Parpala Road.	Take Hwy 101 south from Raymond to Naselle River Bridge. Cross bridge and take first left (Parpala Road).	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-29		Sunshine Point PAC0261 46º-27.936'N 123º-56.203'W	Exclusion - Prevent oil from moving into Naselle River or Long Island Slough.	2400'	Deploy boom at an angle across channel from Sunshine Point to Paradise Point.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-30		Lewis Slough PAC0318 46º-28.535'N 123º-58.328'W	Exclusion - Prevent oil from moving into slough.	1000'	Deploy boom at an angle across slough entrance. Need high tide to boom. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-31		Kaffee Slough PAC0315 46º-28.185'N 123º-57.896'W	Exclusion - Prevent oil from moving into slough.	450'	Deploy boom at an angle across slough entrance. Need high tide to boom. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-32		Baldwin Slough (north entrance) PAC0311 46º-27.036'N 123º-56.945'W	Exclusion - Prevent oil from moving into slough.	400'	Deploy boom at an angle across north slough entrance. Need high tide to boom. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-33		Baldwin Slough (south entrance) PAC0309 46º-26.513'N 123º-56.878'W	Exclusion - Prevent oil from moving into slough.	400'	Deploy boom at an angle across south slough entrance. Need high tide to boom. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-34		Long Island Slough PAC0300 46º-24.731'N 123º-56.249'W	Exclusion - Prevent oil from moving into slough.	900'	Install boom across slough . Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-35		Lake at Willapa National Wildlife Refuge Headquarters PAC0295 46º-24.841'N 123º-56.139'W	Exclusion - Keep oil out of lake.	100'	Block culvert with boom or plywood. Discharge from lake will normally keep oil out. Could enter only at high tide.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond to Willapa NWR Headquarters near south end of Long Island.	National Wildlife Refuge - waterfowl concentrations.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-36		Tidal marsh at mouth of Bear River PAC0355 46º-22.298'N 123º-57.067'W	Exclusion - Prevent oil from moving into tidal marsh.	400'	Deploy boom across tidal marsh entrance west of bridge at Highway 101.	Stage at Highway 101.	Take Hwy 101 south from Raymond. Deploy boom at bridge at mouth of Bear River. Boat access at high tide only from the refuge ramp.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-37		Bear River (main channel) PAC0355 46º-22.321'N 123º-57.035'W	Exclusion - Prevent oil from moving up river.	350'	Deploy boom across river mouth near bridge at WB-36.	Stage at Highway 101.	Take Hwy 101 south from Raymond. Deploy boom near bridge at mouth of Bear River. Boat access only from the refuge ramp.	National Wildlife Refuge - salmon, waterfowl concentrations.
WB-38		Bear River (west channel) PAC0361 46º-22.171'N 123º-57.654'W	Exclusion - Prevent oil from moving up river.	150'	Install boom at an angle across river entrance. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to dike access road. Boat access at high tide only.	National Wildlife Refuge - salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-39		WBNWR Tide Gate #1 PAC0362 46º-22.277'N 123º-57.756'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if the gate leaks. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to dike access road.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-40		WBNWR Tide Gate #2 PAC0362 46º-22.465'N 123º-57.761'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if the gate leaks. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to dike access road.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.
WB-41		WBNWR Tide Gate #3 PAC0363 46º-22.635'N 123º-57.045'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom infront of tide gate if gate cannot be closed or if the gate leaks. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to dike access road.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.
WB-42		Parker Slough PAC0368 46º-22.378'N 124º-00.188'W	Exclusion - Keep oil out of slough.	900'	Deploy boom at an angle across slough entrance. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to Parker Slough.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.
WB-43		Parker Slough Tide Gate PAC0368 46º-22.220'N 124º-00.384'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if the gate leaks. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Follow directions for WB-44, continue on dike access road to tide gate.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.
WB-44		Tarlatt Slough Tide Gate PAC0370 46º-22.202'N 124º-01.091'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if the gate leaks.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 to Peninsula Highway, go north to dirt road 1300' past Pioneer Road, dirt road leads to tide gate.	Shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-45		Tarlatt Slough PAC0369 46º-22.410'N 124º-00.532'W	Exclusion - Prevent oil from moving into slough.	480'	Deploy boom at an angle across slough entrance.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Boat access only at high tide, use ramp at Willapa Bay NWR Headquarters or Nahcotta. Need Willapa NWR permission to access site.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-46		Giles Slough PAC0375 46º-23.505'N 124º-00.965'W	Exclusion - Prevent oil from moving into slough.	900'	Deploy boom at an angle across slough entrance.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Boat access only at high tide, use ramp at Willapa Bay NWR Headquarters or Nahcotta. Need Willapa NWR permission to access site.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-47		Grassy Island (south) PAC0438 46º-37.556'N 124º-02.961'W	Exclusion - Keep oil from moving into marsh area.	1700'	Deploy boom at south end of Grassy Island, high tide only.	Stage at Nahcotta Marina (PAC0403), west of Ocean Park.	Boat access only at high tide, use ramp at Nahcotta or Tokeland. Need Willapa NWR permission to access site.	National Wildlife Refuge - shorebird and waterfowl concentrations, marsh habitat.
WB-48		Grassy Island (north) PAC0438 46º-38.251'N 124º-02.765'W	Exclusion - Keep oil from moving into marsh area.	1000'	Deploy boom at north end of Grassy Island, high tide only. Entrance to marsh is variable and may be blocked with sand.	Stage at Nahcotta Marina (PAC0403), west of Ocean Park.	Boat access only at high tide, use ramp at Nahcotta or Tokeland. Need Willapa NWR permission to access site.	National Wildlife Refuge - shorebird and waterfowl concentrations, marshes.
WB-49		Gunpowder Sands 46º-38.359'N 124º-0.996'W	Deflection - Deflect oil into main channel.	2000'	Angle boom southeast from east side of Gunpowder Sands to deflect oil away.	Stage at Nahcotta Marina (PAC0403), west of Ocean Park.	Boat access only at high tide, use ramp at Nahcotta or Tokeland. Need Willapa NWR permission to access site.	Shorebirds and waterfowl.